



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,244	08/27/2003	Richard D. Breault	C-2821	6014
34196	7590	11/06/2007		
UTC FUEL CELLS, LLC 195 GOVERNOR'S HIGHWAY SOUTH WINDSOR, CT 06074			EXAMINER DOVE, TRACY MAE	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 11/06/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/649,244  
Filing Date: August 27, 2003  
Appellant(s): BREAUULT, RICHARD D.

**MAILED**  
**NOV 05 2007**  
**GROUP 1700**

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 9/5/07 appealing from the Office action mailed 4/9/07.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct. Note the communication filed after final rejection on 6/11/07 was entered by the Examiner, but did not contain any claim amendments.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

3,704,172

STEDMAN et al.

3-1971

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 12-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stedman et al., US 3,704,172.

Stedman teaches a fuel cell stack 2 having adjacent cells 4, 6 that are separated by a porous, hydrophobic barrier layer 30. The cell 4 on one side of the barrier layer 30 defines channels for liquid water and the cell 6 on the other side of the barrier layer defines channels for steam (channels not numbered in the Figure). The water and steam flow channels are in vapor communication with each other through the barrier layer. The evaporative cooling means/barrier layer 30 has a liquid inlet 32 and a vapor outlet 34 for open cycle mode operation cooling (2:70-72). As shown in the Figure, liquid enters the fuel cell at inlet 32 and passes through the water channels, as the water evaporates the steam crosses the barrier 30 (as indicated by the arrow in the Figure) and enters the vapor channels before exiting the fuel cell at vapor outlet 34. The amount of coolant fed to the inlet 32 is a function of the vapor pressure in the outlet 34 of the evaporative cooling means since the vapor pressure is a function of cell temperature (3:43-49). A pressure relief means 36 (vacuum in the steam channel), which may be a pressure relief valve, is disposed in the vapor outlet 34 (3:1-2). A radiator may be used in combination with the evaporative cooling means (3:12-14). The coolant loop including the radiator may include a accumulator 39 and be recirculated through the fuel cell stack.

Stedman does not explicitly teach the steam that has passed through the barrier layer and through outlet 34 is condensed and returned to the reservoir. The steam Stedman explicitly discloses as condensed has not passed through the barrier but is the steam exiting the fuel cell at outlet 28. However, Stedman teaches condensing steam via a radiator so that the steam may be recirculated as liquid coolant. Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the general concept of condensing steam for use as recycled liquid water coolant is known. One of skill

would have found condensing/recycling the steam from outlet 34 obvious in view of the teaching that steam from outlet 28 is condensed/recycled.

Regarding claims 15, 17 and 20, Stedman does not explicitly state the electrolyte layer is a PEM or the operating temperature of the fuel cell.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Stedman teaches hydrogen and oxygen are common fuel and oxidant gases utilized in fuel cells. Hydrogen and oxygen gases are the reactants for polymer electrolyte fuel cells. Stedman further teaches different electrolytes known in the art can be utilized in the fuel cell system disclosed and still provide the advantages and features enumerated in Stedman (2:56-67).

#### **(10) Response to Argument**

Applicant asserts the Stedman reference discloses that in the open cycle mode, the evaporated diluent (steam) is vented overboard and never to be recirculated in the cell stack. However, this assertion is not supported and Applicant does not point to the section of Stedman that teaches the steam is “never to be recirculated”. Stedman teaches condensing steam via a radiator so that the steam may be recirculated as liquid coolant. Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the general concept of condensing steam for use as recycled liquid water coolant is known. One of skill would have found condensing/recycling the steam from outlet 34 obvious in view of the teaching that steam from outlet 28 is condensed/recycled.

Applicant argues Stedman does not teach each claim limitation. However, an anticipation rejection as not be applied to reject any of the presently pending claims.

Applicant argues Stedman does not disclose claim 12, but does not provide any specific arguments regarding claim 12. Applicant only asserts Stedman does not teach the limitations of claims 13, 14, 16, 18, 19 and 21 without providing any specific arguments distinguishing the claimed invention over the Stedman reference. As stated by the Examiner, claim 12-21 are considered obvious in view of Stedman, see rejection above.

Applicant asserts an "open cycle" is inherently distinct from a "closed cycle" and implies elements of an open cycle cannot be combined with elements of a closed cycle. However, Applicant provides no rational for this assertion. Applicant has not provided any convincing evidence or reasoning why one of skill in the art would not have been motivated to condense/recycle the steam exiting the fuel cell via the vapor outlet 34.

Applicant's arguments regarding intended use of the fuel cell (i.e. aboard a space shuttle) are not relevant to the claimed invention. The claims are not directed toward a space shuttle comprising the fuel cell of the claimed invention.

With regards to the declaration filed 1/8/07, the declaration only draws conclusions regarding the creation of a vacuum. This limitation is found in dependent claim 13 and is not contained in independent claim 12. The declaration only states Stedman does not teach the limitations of claim 12. The declaration does not provide any persuasive evidence or reasoning rebutting the Examiner's motivation statement that the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the general concept of condensing steam for use as recycled liquid water coolant is known. One of skill would have found condensing/recycling the steam from outlet 34 obvious in view of the teaching that steam from outlet 28 is condensed/recycled. The declaration does not provide any

Application/Control Number:  
10/649,244  
Art Unit: 1795

Page 6

support for the assertion that elements from an open cycle cannot be combined with elements from a closed cycle and/or that the general concept of condensing steam for use as recycled liquid water coolant is known/conventional.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.


For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

  
TRACY DOVE  
PRIMARY EXAMINER

11/07

Conferees:

  
PATRICK JOSEPH RYAN  
SUPERVISOR / PATENT EXAMINER

WAK

William Rynski,  
T-QAS TC 1700